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Montreal, CANADA

September 11, 2007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE **RECEIVED**
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SEP 11 2007

Applicant: Marie LAPALME
Serial No.: 09/642,052
Filed: August 21, 2000
Title: VIDEO-ASSISTED APPARATUS FOR HEARING IMPAIRED PERSONS
Group Art Unit: 2621
Examiner: Andy S. RAO (571) 272-7337
Agent of Record: Alexandra DAOUD (514) 847-4333

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MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
U.S.A.

APPEAL BRIEF

Sir:

The present appeal brief is being filed in response to the Notification of Non-Compliant Appeal Brief dated August 14, 2007. Please find below an updated appeal brief in accordance with 37 CFR 41.37.

1. REAL PARTY IN INTEREST

The real party of interest in this Appeal is the Assignee, Audisoft Technologies Inc., of Boucherville, Quebec, Canada.

2. RELATED APPEALS AND INTERFERENCES

This Appeal is not related to any other appeals or interferences.

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3. STATUS OF CLAIMS

Claims 11 to 29 are pending in this application. All claims have been finally rejected. All claims have been rejected under 35 U.S.C. 103(a). Claims 24 and 25 have been rejected under 35 U.S.C. 112(2). No claim has been allowed, and all of the claims are under Appeal.

4. STATUS OF AMENDMENTS

Since the Examiner has not indicated that any of the amendments filed in the response dated December 23, 2003 have not been entered, it is assumed that all amendments filed have been entered. In addition, no amendment has been filed subsequent to the final rejection.

5. SUMMARY OF CLAIMED SUBJECT MATTER

Claim 11 is the only independent claim and claims 12 to 29 are all dependent directly or indirectly on claim 11. The claims under Appeal are directed to one invention with the dependent claims specifying more specific limitations. For the purposes of simplifying the Appeal, all claims should be taken as one group.

Claim 11 of the present application relates to a method for providing audio and visual communication between a speaker and a hearing impaired person. The first step of the method is to provide the speaker with a headset frame (page 6, line 16) having a camera attached thereto (figure 1, reference numeral 14) and positioned to capture images of the mouth of the speaker (page 6, lines 18-20, figure 1). A hearing impaired person is provided with a display (figure 1, references H and 20), wherein sound emitted by the speaker and received by the hearing impaired person essentially does not allow the hearing impaired person to understand the speaker. Continuous video images of the mouth of the speaker are captured using the camera (figure 1). The images are transmitted in real-time (page 16, lines 9-10) in an uncompressed manner (page 17, lines 5 to 16) to the display for the hearing impaired person to view such that movement of the mouth of the speaker coincides with sound emitted by the speaker and enables the hearing impaired person to understand the speaker (page 14, lines 1 to 15).

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Commissioner for PatentsSerial No. 09/642,052**6. GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

The only ground of rejection to be reviewed on appeal is that of the rejection of claim 11 under 35 U.S.C. 103(a) with regard to U.S. patent 5,886,735 issued to Bullister in view of U.S. patent 5,742,335 issued to Cannon.

Claims 26-29 are also rejected under 35 U.S.C. 103(a) with regard to U.S. patent 5,886,735 issued to Bullister in view of U.S. patent 5,742,335 issued to Cannon. This rejection is not to be reviewed on appeal.

Claims 12, 13, 15, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bullister and Cannon as applied to claims 11, and 26-29 and further in view of US Patent 5,884,197 to Ricardo et al. This rejection is not to be reviewed on appeal.

Claims 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bullister, Cannon, and Ricardo et al. as applied to claims 11-13, 15, 17, 19, and 26-29, and further in view of US Patent 6,154,207 to Farris et al. This rejection is not to be reviewed on appeal.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bullister, Cannon, and Ricardo et al. as applied to claims 11-13, 15, 17, 19, and 26-29, and further in view of US Patent 5,903,574 to Lyons. This rejection is not to be reviewed on appeal.

Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bullister, Cannon, and Ricardo et al. as applied to claims 11-13, 15, 17, 19, and 26-29, and further in view of US Patent 6,331,972 to Harris et al. This rejection is not to be reviewed on appeal.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bullister, Cannon, and Ricardo et al. as applied to claims 11-13, 15, 17, 19, and 26-29, and further in view of US Patent 5,128,755 to Fancher. This rejection is not to be reviewed on appeal.

Claims 24 and 25 are rejected under 35 U.S.C. 112(2) as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This rejection is not to be reviewed on appeal.

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7. ARGUMENTS

It should be appreciated that for the present invention, the person skilled in the art is one knowledgeable in not only the art of video-conferencing, but also in technology used for hearing-impaired persons. The existing technology in this field is very deficient because technologies used for regular users are not being adapted to the hearing-impaired properly by taking into account the specific needs of the hearing-impaired.

The Applicant respectfully disagrees with the rejection of claim 11 with respect to Bullister and Cannon. The following four issues explain in detail the reasoning for the disagreement.

First Issue

The first issue is whether the term "real time" used in claim 11 should be interpreted as within a time span of less than 33 milliseconds. To qualify Issue (1), the claims as originally filed have the term "real-time". While the Applicant has defined in the application the following:

"According to the person skilled in the art of the present invention, real time is defined as a maximum delay of 33 msec (milliseconds) between the moment when the image is perceived and the moment when the sound is perceived (c.f. The Effect of Imperfect Cues on the Reception of Cued Speech", written by Maroula Sarah Bratakos of the Massachusetts Institute of Technology, September 1995)." (page 3, lines 7-12)

the Examiner refuses to read the term in the claim as meaning 33 msec or less and argues that the specification is not the measure of the invention. The Examiner maintains that limitations contained in the specification cannot be read into the claims for the purpose of avoiding the prior art.

The Applicant believes that according to section 2111 of the MPEP, 1-the claims must be given their plain meaning unless they are defined in the specification, 2-"plain meaning" refers to the ordinary and customary meaning given to the term by those of ordinary skill in the art, and 3-the Applicant may be own lexicographer.

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Section 2111 of the MPEP states that claims must be given their broadest reasonable interpretation. However, *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997), the court stated that "the PTO applies to verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in applicant's specification." (emphasis added). From this statement, it can be understood that any definition clearly and explicitly stated in the description is to be taken into account when giving a term in a claim the broadest reasonable meaning.

Section 2111 of the MPEP also states that "the broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach". The Applicant submits that the definition of 33 msec or less was given in accordance with a publication relating to real time for cued speech. As indicated above, the field of the present invention is technology used for hearing-impaired persons and a person skilled in this field would readily understand that a time delay above 33 msec would not be possible for a device used for the specific application described in the present invention, namely communication with a hearing-impaired person.

Section 2111.01(I) of the MPEP is very clear in its interpretation of words in a claim that are defined in the specification. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989), the court stated that "the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification". The Applicant hereby submits that the definition provided on page 3, lines 7 to 12 of the application as originally filed and reproduced herein above constitutes a clear definition as required by the jurisprudence. Therefore, the term "real time" should be interpreted in view of this definition.

Additionally, Section 2111.01(II) of the MPEP states that "If intrinsic reference sources, such as dictionaries, evidence from more than one definition for the term, the intrinsic record must be consulted to identify which of the different possible definitions is most consistent with applicant's use of the terms". It can be appreciated

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that the term "real time" has come to be known as a broad expression meaning substantially simultaneously or with no intentional delay. The Merriam-Webster's Collegiate Dictionary of real-time is defined as "the actual time during which something takes place" and dates back to 1953. Given that this is the age of technology and the possibilities for "real time" are constantly evolving, the definition may vary anywhere between no noticeable delay in time and a very specific time delay. It is precisely for this reason that the Applicant felt the need to define the term in the application in order to correspond to the requirements of the invention. A person skilled in the art of the present invention would easily recognize the need for this constraint on "real time" given the nature of the invention. Therefore, the limitation of 33 msec or less should be read into the claim.

Finally, Section 2111.01(III) stipulates that the Applicant may be his own lexicographer. *In re Paulsen*, 30 F.3d 1475, 1480, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994), the court stated that an inventor may define specific terms used to describe invention, but must do so "with reasonable clarity, deliberateness, and precision" and, if done, must "'set out his uncommon definition in some manner within the patent disclosure' so as to give one of ordinary skill in the art notice of the change" in meaning. The Applicant hereby submits that the definition of "real time", as set out in the specification by the applicant, fully complies with the requirements set out by the courts. It is sufficiently clear in the specification to any person skilled in the art of the present invention.

Therefore, the definition as set out should be read into the claim.

Second Issue

The second issue is whether US patent 5,742,335 to Cannon teaches "real time" transmission as understood in issue (1). Assuming the term "real time" were understood as being within a time span of less than 33 msec, Cannon does not teach a real time transmission that meets this definition.

Cannon is related to the detection of defects in buildings and other large manmade structures and more particularly to a method and apparatus of structural defect detection using visual and infrared cameras. Two cameras, a local infrared

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camera and a local visual-spectrum camera, are mounted on a helmet that is worn by a photographer or camera operator. Video signal transmitters coupled to these cameras are mounted on the helmet. Video signals are transmitted by the transmitters and received by respective signal monitors at a ground station. A succession of frames creates a movie describing each area of interest on the surface of the building. The helmet may also include an audio head set and transmitter, by which means the photographer can give an audio commentary on the area which he or she is inspecting.

The "real time" transmission described by Cannon should be understood from the context of the application as meaning that someone in a remote location can view the images and hear the audio commentary at substantially the same time as the photographer performing the inspection. This does not correspond to the definition of "real time" as per issue (1), which is having a maximum delay of 33 milliseconds between the moment when the image is perceived and the moment when the sound is perceived. Cannon does not teach capturing an image of the speaker's mouth and is not related to the art of communication between a speaker and a hearing impaired person. There is no need to synchronize image and sound since there is no lip movement to match with the auditory cues. Therefore, Cannon has no reason to suggest transmitting images in an uncompressed manner and meeting the requirements of "real time" transmission as per the present application.

Third Issue

The third issue is whether it is an invention to use, for the hearing-impaired, equipment that is known in the art for the hearing-enabled. The Applicant believes that it is non-obvious to use, for the hearing-impaired, equipment that is known in the art for the hearing-enabled.

As stated above, the person skilled in the art of the present invention is knowledgeable in technology used for hearing-impaired persons. Enclosed herewith in Appendix A is a signed declaration by an expert in the field of adaptive technology for the disabled. This person has significant experience working with technology used for people with hearing losses, as evidenced by points (3) and (4) of the declaration.

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As per point (5) of the declaration, the expert has testified that "the field of adaptive technology is considered to be an industry separate from the industry of regular technology". The Applicant respectfully submits that the two fields are not as analogous as one may initially believe them to be. There are additional constraints imposed on a system due to the limitations of a hearing-impaired person. These limitations are not considered by a maker of standard telecommunication equipment and therefore, this equipment is not expected to work for the hearing-impaired.

As per point (6) of the declaration, the expert has never experienced himself video-conferencing with proper synchronization of the image with the sound. We can understand what is meant by "proper synchronization" by considering point (7) of the declaration, where the expert compares the effect of a lack of synchronization for a person with a hearing loss, to the feeling a hearing enabled person might experience when watching a movie that has been dubbed into another language. Proper synchronization is a requirement for the hearing-impaired. Given that an expert in the field has never participated in a video-conference which was adequate for a person with a hearing loss, we can conclude that there is no expectation from the part of a person skilled in the art that standard video-conferencing equipment will enable communication for the hearing-impaired.

As per point (10) of the declaration, the expert believes that standard video-conferencing equipment would fail to allow a person having a hearing loss to understand a conversation. This goes to the operability of standard equipment for the hearing-impaired, as well as to the expectation of a positive result when dealing with technology made for the hearing-enabled.

As per point (11) of the declaration, the expert does not believe that standard video-conferencing equipment is the closest prior art to the claimed invention. There is no expectation of operability from standard video-conferencing equipment and therefore, a person in the field of adaptive technology does not look towards this field for equipment that can be used for the hearing-impaired.

In view of the above, it is respectfully submitted that it is non-obvious to use standard equipment available in the field of telecommunications specifically for the hearing-impaired.

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Commissioner for PatentsSerial No. 09/642,052**Fourth Issue**

The fourth issue is whether there is motivation to modify the equipment described by US patent 5,886,735 to Bullister to enable communication with a hearing-impaired person. The Applicant maintains there is no motivation to modify the equipment described by US patent 5,886,735 to Bullister to enable communication with a hearing-impaired person.

The Applicant has argued that the main reference cited by the Examiner, namely US patent 5,886,735 to Bullister, fails to disclose communication with a hearing-impaired person. The Examiner has stated that any person, including a hearing-impaired person, may view the display as shown in Figure 3 of Bullister. The question is not whether a hearing-impaired person can view the display, but rather whether communication between the hearing-impaired person and the speaker is enabled. The claim currently in dispute is a method claim which defines achieving a result. If this result is not achievable using the equipment described by Bullister, this reference fails to teach or suggest the claimed invention.

Bullister teaches a video telephone headset device which includes a video camera configured to capture an image of the user's face when the headset is held adjacent to the user's head. The camera may be oriented towards an image capture mirror located immediately in front of a user's face. The image capture mirror reflects the image of the user's face to the camera. The images are captured and transmitted to a display in order to provide visual communication between the speaker and another party. The system also provides audio communication between the two parties.

Communication with a hearing-impaired person cannot be enabled with the equipment taught by Bullister. In order to enable communication, the sound and image must be synchronized to a level that would allow the hearing-impaired person to comprehend. As per the expert's declaration, this synchronization is vital to the understanding of a hearing-impaired person when lip-reading. Otherwise, the level of understanding is deeply affected and communication is not enabled. The synchronization of image and sound in video-conferencing equipment is affected by

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performing operations on the image signal. Such operations can delay the image signal and therefore, affect the synchronicity.

As stated in the background of the invention of the present application, "In the Bullister patent, software image correction occurs, which is time consuming, i.e. at least about 500 msec for a full image. Furthermore, signal compression through a MPEG compressor takes place, which delays the image transfer of approximately 33 msec, as does the decompression through a MPEG compressor, the latter not being shown in the Bullister patent, but being necessary to decompress the image compressed by the MPEG compressor. Thus, important delays amounting to up to 2000% and more of a real time transmission occur with the device shown in the Bullister patent." (page 3, lines 12-19).

Thus, it is respectfully submitted that not only does Bullister not teach or suggest transmitting the images in an uncompressed manner, it teaches away from this by specifying that software correction (column 3, lines 44-48) and compression/decompression of the image is performed by the disclosed device. It is virtually impossible for a system that has such enormous time delays to be used by a hearing-impaired person in the context of the present application. Since a hearing-impaired person is the receiving party for the images, it is necessary that the images be transmitted without compression or decompression to ensure that full motion video be transmitted without jittering or frame loss and within a minimum time delay. Compression and decompression of a signal can have two consequences: (1) delay of the signal and (2) the possibility that a frame is dropped or that the frame rate not be conducive for full motion video. For the application where the speaker and the receiving party are in the same room, the time delay is an important factor such that sound received through air corresponds to the lip motion displayed on screen. For the application where the two parties are not in the same room, maintaining full motion video to ensure that no frames are dropped such that the communication is clear is also very important. There would be a significant delay caused by the distortion correction and MPEG compressor, as shown in figure 11 of the reference. This significant delay would be enough to confuse a user that is hearing-impaired and prevent proper

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comprehension of what the speaker is saying. Therefore, communication would not be enabled.

As per point (10) of the expert's declaration, a system which corresponds to the criteria as described in column 11, lines 1-4 of Bullister, namely a commonly available POTS line (28.8-33 kbps) or an ISDN line (64 kbps), provides inadequate communication for a hearing-impaired person. It is clear from the reference that the system described is fully intended to be used with a low bandwidth system. As a matter of fact, this is cited as one of the objects of the invention, as stated on column 3, lines 8-11.

There is no motivation to use a better bandwidth to reduce the delays between the sound and image since the reference specifically teaches towards reducing the transmission bandwidth requirements. Furthermore, there is no motivation to remove the software correction step of the system as it is fundamentally linked to the central concept of the system. The software correction is used to correct the signal received by the camera capturing the facial expressions of the speaker in the reflection given by the mirror on the headset, in order to correct for distortions and perspective based on the curvature and on the predetermined position of the headset with respect to the face. Without this software correction, the image presented to the second party would be of lower quality. This would be counter-intuitive and go against the teachings of the reference.

Therefore, there is no motivation to modify the equipment taught by Bullister in order to use it for the hearing-impaired. In light of the above issues, the Applicant respectfully requests that the 103(a) rejection of claim 11 be overturned.

Remarks

The inventive aspect of claim 11 comes from the inventor's recognition that technology of the prior art is not compatible with hearing-impaired persons due to additional constraints. It is precisely this recognition, that the system taught by Bullister cannot be used for hearing-impaired persons, that led to the present invention. The combination of providing an image of the speaker's mouth and reducing delays in the

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system to have the sound emitted by a speaker and movement of the speaker's mouth on a display coincide is new and non-obvious above and beyond the cited references.

Additionally, testimony from the expert can vouch for the significant advantage provided to people with hearing losses when using the system of the claimed invention. Points (9) and (12) of the declaration are specifically directed to the benefits of the Audisee™ system, which is the system produced by the Applicant and on which the present application is based. The method as recited in claim 11 is performed when using the Audisee™ system. This unexpected result and positive reaction by a person skilled in the art should be taken into account when considering the patentability of the present claims.

Accordingly, a decision in favor of the acceptability of the claims under appeal is respectfully solicited.

8. CLAIMS APPENDIX

An appendix containing a copy of the claims involved in the appeal can be found enclosed herewith.

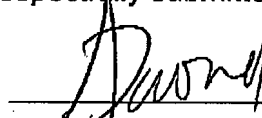
9. EVIDENCE APPENDIX

An evidence appendix containing a declaration signed by Tom Sheridan, an expert in the field of adaptive technology used for people with hearing losses, can be found enclosed herewith.

10. RELATED PROCEEDINGS APPENDIX

No related proceedings appendix is being provided herewith.

Respectfully submitted,



Alexandra Daoud

Agent of Record, Registration No. 55,992

CUSTOMER NUMBER 020988

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Commissioner for Patents

Serial No. 09/642,052

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being facsimile transmitted to the
Patent and Trademark Office on the date shown below.

Alexandra Daoud, Reg. 55,992

Name of person signing certification


Signature

September 11, 2007

Date

CLAIMS APPENDIX

CLAIMS APPENDIX

1-10: previously cancelled

11. A method for providing audio and visual communication between a speaker and at least one hearing impaired person, the method comprising:

providing said speaker with a headset frame having a camera attached thereto and positioned to capture images of a mouth of said speaker;

providing said at least one hearing impaired person with at least one display, wherein sound emitted by said speaker and received by said hearing impaired person essentially does not allow said hearing impaired person to understand said speaker;

capturing continuous video images of said mouth of said speaker using said camera; and

transmitting said images in real-time in an uncompressed manner to said at least one display for said at least one hearing impaired person to view such that movement of said mouth of said speaker coincides with sound emitted by said speaker and enables said hearing impaired person to understand said speaker.

12. A method as claimed in claim 11, further comprising:

capturing continuous sound emitted by said speaker via a microphone attached to said headset frame; and

transmitting said sound in real time to at least one amplifying device located proximate to said at least one hearing impaired person such that speech of said speaker can be simultaneously heard from said speaker and through said amplifying device.

13. A method as claimed in claim 12, wherein said transmitting said images and transmitting said sound comprises transmitting via a wireless video signal and a wireless audio signal, respectively.

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14. A method as claimed in claim 13, wherein said transmitting via a wireless video signal and a wireless audio signal comprises transmitting using low-power transmissions.
15. A method as claimed in claim 11, wherein said transmitting said images comprises transmitting via a wireless video signal.
16. A method as claimed in claim 15, wherein said transmitting via a wireless video signal comprises transmitting via a low-power wireless video signal.
17. A method as claimed in claim 13, wherein said video signal and said audio signal are transmitted as two distinct signals on respective wave bands.
18. A method as claimed in claim 17, wherein said video signal is transmitted on a wave band located in a 902 to 928 MHz range, and wherein said audio signal is transmitted on a wave band located in a 72 to 76 MHz range.
19. A method as claimed in claim 12, wherein said amplifying device is a hearing aid device.
20. A method as claimed in claim 18, wherein at least two redundant channels are used for said audio signal, such that said at least one hearing impaired person can choose according to best reception.
21. A method as claimed in claim 12, wherein voice recognition is performed on said speech of said speaker to transform said speech in written form.
22. A method as claimed in claim 21, wherein said written form is output on said at least one output display for said at least one hearing impaired person to visualize.
23. A method as claimed in claim 21, wherein said voice recognition is performed on said speech and on said video images.

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24. A method as claimed in claim 12, wherein said voice recognition is performed on said video images of said speaker to transform said speech into written form.

25. A method as claimed in claim 24, wherein said written form is output on said at least one display for said at least one hearing impaired person to visualize.

26. A method as claimed in claim 11, wherein each of said at least one hearing impaired person is provided with a display.

27. A method as claimed in claim 11, wherein said camera is positioned to capture images of said mouth of said speaker and facial expressions of said speaker.

28. A method as claimed in claim 11, wherein said hearing-impaired person has a diminished sense of hearing.

29. A method as claimed in claim 28, wherein said hearing impaired person has an essentially unobstructed view of said speaker and receives said sound emitted by said speaker through air.

EVIDENCE APPENDIX

File: 15816-5US AD

Montreal, CANADA

October 8, 2004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Marie LAPALME
Serial No.: 09/642,052
Filed: August 21, 2000
Title: VIDEO-ASSISTED APPARATUS FOR HEARING IMPAIRED
PERSONS
Group Art Unit: 2613
Examiner: Richard LEE (703) 308-6612
Agent of Record: Alexandra Daoud (514) 847-4333

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Declaration

I, Tom Sheridan, do hereby solemnly declare that:

(1) I am a citizen of Canada and my residential address is 420
Huffman Crescent, Edmonton, AB, Canada T5A 4C8

(2) I am an Adaptive Technology Specialist with the Specialized
Support and Disability Services (SSDS) at the University of Alberta.

(3) I am a specialist in assistive technology (technology that helps
people with disabilities) and have been working with people having disabilities,

such as deaf and hard of hearing people, for 19 years. In August, 1999, I joined SSDS as the Adaptive Technology Specialist. My responsibilities include assessing technology needs of students and staff with disabilities, recommending appropriate adaptive technology, and providing training in the use of that technology. I manage two computer labs with adaptive technology at SSDS, as well as the technology in satellite labs across campus. I serve as a liaison to faculties and departments regarding hardware and software compatibility with adaptive technology, and advise on future needs and trends. I serve as a consultant with the greater community, providing information to agencies, hospitals, schools and other post secondary institutions about available technology, training and services. I have nineteen years of experience evaluating, assessing and training students, as well as professionals, with all types of disabilities in the use of adaptive technology. My training also includes Braille transcription (Level II), with six years of Nemeth code, and Level IV American Sign Language.

(4) I am a member of the Alberta Consortium of Rehabilitation and Assistive Technology (ACRAT), consultant for Occupation Performance Analysis Unit, Faculty of Rehabilitation Medicine University of Alberta (OPAU), member of Canadian Association for Disabled Skilling (CADS), and a member of Alberta Sports and Recreation Association for the Blind (ASRAB). I am an author or have co-authored adaptive technology training manuals for on-campus University students. These include Assistive Listening Device manuals, Braille Screen Reading manuals, Voice Recognition manuals, Augmentative Communication manuals and Alternate Access manuals. I have given the following presentations: "Introduction Overview to Assessments and Implementation of Assistive Technology for Professionals in Post-Secondary Institutions" at the University of Alberta. "Scanning the Horizons Global Perspectives on Higher Education and Disability" and "Beyond the White Cane" at AHEAD (Association on Higher Education and Disability).

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(5) The field of adaptive technology is considered to be an industry separate from the industry of regular technology. In my experience within the industry, it is generally recognized that getting something to work for the needs of the hard of hearing and deaf is considered an innovation. To adapt and use technology created for the hearing and to have it successfully used for the hard of hearing and deaf is considered an innovation in this field.

(6) I am a hearing person and have participated in video-conferencing using standard video-conferencing equipment. I have never, in my life-time, experienced video-conferencing where the voice and image were properly synchronized. Using such equipment, I was able to detect a delay between image and audio reception, the delay being visually evident. Additionally, loss of frames often caused the image to momentarily freeze until a subsequent frame was received. Both of these factors were a nuisance. I have noticed that the farther the distance over which the video-conferencing is taking place, the more noticeable the delay between the sound and the images. If the system were set up for all parties to be in the same room, or over a very short distance, the delay would be smaller and less noticeable. However, standard video-conferencing equipment is rarely used over short distances, as this is not its intended purpose.

(7) Many people, whether hearing or with hearing loss, lip-reading can benefit from the use of visual cues are helpful to everyone during communication because it facilitates lip-reading. Use of visual cues are helpful to everyone during communication. The added value of lip-reading for a hearing person is not as significant but will help fill in small gaps if a word or two is missed or if the speaker has an accent that is hard to understand. A common experience where hearing people may notice this is when watching a foreign movie that has been dubbed into a different language, for example, a Spanish movie dubbed into English. The mismatch between the movement of the lips and the sound being heard is noticeable and distracting. Since a hearing person can completely understand the audio, there is no significant loss in understanding the foreign

movie. However, a person with hearing loss will be significantly more affected by this lack of synchronicity.

(8) To the best of my knowledge and belief, a person with a hearing loss who has not lost 100% of his hearing ability is greatly aided in his comprehension when provided with both audio and visual support. It is known that a person with a severe hearing loss will have a rate of recognition for consonants that is approximately 30% greater with audio and visual support than if only audio cues or only visual cues were present (Erber, N.P. (1972). Auditory, visual, and auditory-visual recognition of consonants by children with normal and impaired hearing. Journal of Speech and Hearing Research, vol. 15, 413-422). It is also known that in an environment where a signal-to-noise ratio is approximately 19.5 dB, a person with a hearing loss will get approximately 60% more sentences correct with an audio-visual support than with only an auditory support (Alison MacLeod and Quentin Summerfield (1990). British Journal of Audiology, 1990, 24. 29-43.). However, introducing a noticeable delay between the audio and visual support will take away the benefits afforded by the dual support system.

(9) I have worked with students who have hearing loss and am aware that they typically benefit understanding what is being said by combining lip-reading and facial expressions (for example, raising of eyebrows, frowns, etc) with the sounds of speech. In that context, I have observed the benefits on students with hearing loss using the Audisee™ system. The primary benefits can be attributed to the fact that the Audisee™ system transmits the sound of the speaker and the picture of that person's face (especially lips) in a synchronized manner. The student can follow the lip movements at the same time they are receiving auditory cues. This synchronicity does not exist in the form of video-conferencing technology, where there is always a time lapse between the picture and the sound. The benefit of the Audisee™ system in the lecture theatre is

particularly valuable because, as the professor turns his/her back to the class to write on the blackboard, the student still gets the image of the professor's face.

(10) To the best of my knowledge and belief, it would not be obvious to modify a standard video-conferencing system to synchronize image and audio, (especially in the case of a system that must compensate for distortions) by doing a transformation operation on the signal that represents the video image. Moreover, a system using a commonly available POTS line (28.8-33 kbps) or an ISDN line (64 kbps) is not of high enough quality to match the sound with the image. This system would fail to allow a person having a hearing loss to understand a conversation because the quality of the video on its own would be inadequate, the audio on its own would be inadequate, and the combination of the audio and video would not fall within the parameters of 33msec.

(11) To the best of my knowledge and belief, the closest prior art to what the Audisee™ system does is having a video overlay of someone signing (i.e., a video overlay of an interpreter doing sign language) while a speaker speaks, which works efficiently for the person with hearing loss who knows sign language.

(12) I have recommended the Audisee™ system to persons with a hearing loss and have seen them use it. I have witnessed the significant advantage provided by the Audisee™ system to persons with a hearing loss.

(13) The statements made above are of my opinion and do not necessarily reflect the opinions of my employer, the University of Alberta.

(14) I, the undersigned, declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable

by fine or imprisonment, or both, under 18 U.S.C §1001 of the United States Code and that such willful false statements may jeopardize the validity of any patent issued for the above-referenced patent application.

Tom Sheridan

By: 

Date: OCT. 6. 2004